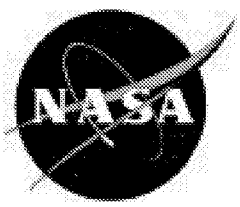
NASA/SP—1999-7011/SUPPL485
February 22, 1999

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES



National Aeronautics and
Space Administration
Langley Research Center
**Scientific and Technical
Information Program Office**

The NASA STI Program Office . . . in Profile

Since its founding, NASA has been dedicated to the advancement of aeronautics and space science. The NASA Scientific and Technical Information (STI) Program Office plays a key part in helping NASA maintain this important role.

The NASA STI Program Office is operated by Langley Research Center, the lead center for NASA's scientific and technical information. The NASA STI Program Office provides access to the NASA STI Database, the largest collection of aeronautical and space science STI in the world. The Program Office is also NASA's institutional mechanism for disseminating the results of its research and development activities. These results are published by NASA in the NASA STI Report Series, which includes the following report types:

- TECHNICAL PUBLICATION. Reports of completed research or a major significant phase of research that present the results of NASA programs and include extensive data or theoretical analysis. Includes compilations of significant scientific and technical data and information deemed to be of continuing reference value. NASA's counterpart of peer-reviewed formal professional papers but has less stringent limitations on manuscript length and extent of graphic presentations.

- TECHNICAL MEMORANDUM. Scientific and technical findings that are preliminary or of specialized interest, e.g., quick release reports, working papers, and bibliographies that contain minimal annotation. Does not contain extensive analysis.

- CONTRACTOR REPORT. Scientific and technical findings by NASA-sponsored contractors and grantees.

- CONFERENCE PUBLICATION. Collected papers from scientific and technical conferences, symposia, seminars, or other meetings sponsored or cosponsored by NASA.

- SPECIAL PUBLICATION. Scientific, technical, or historical information from NASA programs, projects, and missions, often concerned with subjects having substantial public interest.

- TECHNICAL TRANSLATION. English-language translations of foreign scientific and technical material pertinent to NASA's mission.

Specialized services that complement the STI Program Office's diverse offerings include creating custom thesauri, building customized databases, organizing and publishing research results . . . even providing videos.

For more information about the NASA STI Program Office, see the following:

- Access the NASA STI Program Home Page at ***http://www.sti.nasa.gov***

- E-mail your question via the Internet to help@sti.nasa.gov

- Fax your question to the NASA STI Help Desk at (301) 621-0134

- Telephone the NASA STI Help Desk at (301) 621-0390

- Write to:
  NASA STI Help Desk
  NASA Center for AeroSpace Information
  7121 Standard Drive
  Hanover, MD 21076-1320

Introduction

This supplemental issue of *Aerospace Medicine and Biology, A Continuing Bibliography with Indexes* (NASA/SP—1999-7011) lists reports, articles, and other documents recently announced in the NASA STI Database.

In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which humans are subjected during and following simulated or actual flight in the Earth's atmosphere or in interplanetary space. References describing similar effects on biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. Applied research receives the most emphasis, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

Each entry in the publication consists of a standard bibliographic citation accompanied, in most cases, by an abstract.

The NASA CASI price code table, addresses of organizations, and document availability information are included before the abstract section.

Two indexes—subject and author are included after the abstract section.

SCAN Goes Electronic!

If you have electronic mail or if you can access the Internet, you can view biweekly issues of *SCAN* from your desktop absolutely free!

Electronic SCAN takes advantage of computer technology to inform you of the latest worldwide, aerospace-related, scientific and technical information that has been published.

No more waiting while the paper copy is printed and mailed to you. You can view *Electronic SCAN* the same day it is released—up to 191 topics to browse at your leisure. When you locate a publication of interest, you can print the announcement. You can also go back to the *Electronic SCAN* home page and follow the ordering instructions to quickly receive the full document.

Start your access to *Electronic SCAN* today. Over 1,000 announcements of new reports, books, conference proceedings, journal articles...and more—available to your computer every two weeks.

For Internet access to *E-SCAN*, use any of the following addresses:

http://www.sti.nasa.gov
ftp.sti.nasa.gov
gopher.sti.nasa.gov

To receive a free subscription, send e-mail for complete information about the service first. Enter **scan@sti.nasa.gov** on the address line. Leave the subject and message areas blank and send. You will receive a reply in minutes.

Then simply determine the SCAN topics you wish to receive and send a second e-mail to **listserv@sti.nasa.gov**. Leave the subject line blank and enter a subscribe command, denoting which topic you want and your name in the message area, formatted as follows:

Subscribe SCAN–02–01 Jane Doe

For additional information, e-mail a message to **help@sti.nasa.gov**.

Phone: (301) 621-0390

Fax: (301) 621-0134

Write: NASA STI Help Desk
NASA Center for AeroSpace Information
7121 Standard Drive
Hanover, MD 21076-1320

Looking just for *Aerospace Medicine and Biology* reports?

Although hard copy distribution has been discontinued, you can still receive these vital announcements through your *E-SCAN* subscription. Just **Subscribe SCAN-AEROMED Jane Doe** in the message area of your e-mail to **listserv@sti.nasa.gov**.

Table of Contents

Records are arranged in categories 51 through 55, the Life Sciences division of *STAR*. Selecting a category will link you to the collection of records cited in this issue pertaining to that category.

Indexes

Two indexes are available. You may use the find command under the tools menu while viewing the PDF file for direct match searching on any text string. You may also view the indexes provided, for searching on *NASA Thesaurus* subject terms and author names.

Selecting an index above will link you to that comprehensive listing.

Document Availability

Select **Availability Info** for important information about NASA Scientific and Technical Information (STI) Program Office products and services, including registration with the NASA Center for AeroSpace Information (CASI) for access to the NASA CASI TRS (Technical Report Server), and availability and pricing information for cited documents.

The New NASA Video Catalog is Here

Free!

To order your copy,
call the NASA STI Help Desk at
(301) 621-0390,
fax to
(301) 621-0134,
e-mail to
help@sti.nasa.gov,
or visit the NASA STI Program
homepage at
http://www.sti.nasa.gov

(Select STI Program Bibliographic Announcements)

Explore the Universe!

Document Availability Information

The mission of the NASA Scientific and Technical (STI) Program Office is to quickly, efficiently, and cost-effectively provide the NASA community with desktop access to STI produced by NASA and the world's aerospace industry and academia. In addition, we will provide the aerospace industry, academia, and the taxpayer access to the intellectual scientific and technical output and achievements of NASA.

Eligibility and Registration for NASA STI Products and Services

The NASA STI Program offers a wide variety of products and services to achieve its mission. Your affiliation with NASA determines the level and type of services provided by the NASA STI Program. To assure that appropriate level of services are provided, NASA STI users are requested to register at the NASA Center for AeroSpace Information (CASI). Please contact NASA CASI in one of the following ways:

E-mail:	help@sti.nasa.gov
Fax:	301-621-0134
Phone:	301-621-0390
Mail:	ATTN: Registration Services NASA Center for AeroSpace Information 7121 Standard Drive Hanover, MD 21076-1320

Limited Reproducibility

In the database citations, a note of limited reproducibility appears if there are factors affecting the reproducibility of more than 20 percent of the document. These factors include faint or broken type, color photographs, black and white photographs, foldouts, dot matrix print, or some other factor that limits the reproducibility of the document. This notation also appears on the microfiche header.

NASA Patents and Patent Applications

Patents and patent applications owned by NASA are announced in the STI Database. Printed copies of patents (which are not microfiched) are available for purchase from the U.S. Patent and Trademark Office.

When ordering patents, the U.S. Patent Number should be used, and payment must be remitted in advance, by money order or check payable to the Commissioner of Patents and Trademarks. Prepaid purchase coupons for ordering are also available from the U.S. Patent and Trademark Office.

NASA patent application specifications are sold in both paper copy and microfiche by the NASA Center for AeroSpace Information (CASI). The document ID number should be used in ordering either paper copy or microfiche from CASI.

The patents and patent applications announced in the STI Database are owned by NASA and are available for royalty-free licensing. Requests for licensing terms and further information should be addressed to:

National Aeronautics and Space Administration
Associate General Counsel for Intellectual Property
Code GP
Washington, DC 20546-0001

Sources for Documents

One or more sources from which a document announced in the STI Database is available to the public is ordinarily given on the last line of the citation. The most commonly indicated sources and their acronyms or abbreviations are listed below, with an Addresses of Organizations list near the back of this section. If the publication is available from a source other than those listed, the publisher and his address will be displayed on the availability line or in combination with the corporate source.

Avail: NASA CASI. Sold by the NASA Center for AeroSpace Information. Prices for hard copy (HC) and microfiche (MF) are indicated by a price code following the letters HC or MF in the citation. Current values are given in the NASA CASI Price Code Table near the end of this section.

Note on Ordering Documents: When ordering publications from NASA CASI, use the document ID number or other report number. It is also advisable to cite the title and other bibliographic identification.

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy.

Avail: BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown. (If none is given, inquiry should be addressed to the BLL.)

Avail: DOE Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of Department of Energy reports, usually in microfiche form, are listed in Energy Research Abstracts. Services available from the DOE and its depositories are described in a booklet, *DOE Technical Information Center—Its Functions and Services* (TID-4660), which may be obtained without charge from the DOE Technical Information Center.

Avail: ESDU. Pricing information on specific data, computer programs, and details on ESDU International topic categories can be obtained from ESDU International.

Avail: Fachinformationszentrum Karlsruhe. Gesellschaft für wissenschaftlich-technische Information mbH 76344 Eggenstein-Leopoldshafen, Germany.

Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, CA. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.

Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.

Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Administration (JBD-4), Public Documents Room (Room 1H23), Washington, DC 20546-0001, or public document rooms located at NASA installations, and the NASA Pasadena Office at the Jet Propulsion Laboratory.

Avail: NTIS. Sold by the National Technical Information Service. Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) are available. For information concerning this service, consult the NTIS Subscription Section, Springfield, VA 22161.

Avail: Univ. Microfilms. Documents so indicated are dissertations selected from Dissertation Abstracts and are sold by University Microfilms as xerographic copy (HC) and microfilm. All requests should cite the author and the Order Number as they appear in the citation.

Avail: US Patent and Trademark Office. Sold by Commissioner of Patents and Trademarks, U.S. Patent and Trademark Office, at the standard price of $1.50 each, postage free.

Avail: (US Sales Only). These foreign documents are available to users within the United States from the National Technical Information Service (NTIS). They are available to users outside the United States through the International Nuclear Information Service (INIS) representative in their country, or by applying directly to the issuing organization.

Avail: USGS. Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed on the Addresses of Organizations page. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.

Addresses of Organizations

British Library Lending Division
Boston Spa, Wetherby, Yorkshire
England

Commissioner of Patents and Trademarks
U.S. Patent and Trademark Office
Washington, DC 20231

Department of Energy
Technical Information Center
P.O. Box 62
Oak Ridge, TN 37830

European Space Agency–
Information Retrieval Service ESRIN
Via Galileo Galilei
00044 Frascati (Rome) Italy

ESDU International
27 Corsham Street
London
N1 6UA
England

Fachinformationszentrum Karlsruhe
Gesellschaft für wissenschaftlich–technische
Information mbH
76344 Eggenstein–Leopoldshafen, Germany

Her Majesty's Stationery Office
P.O. Box 569, S.E. 1
London, England

NASA Center for AeroSpace Information
7121 Standard Drive
Hanover, MD 21076-1320

(NASA STI Lead Center)
National Aeronautics and Space Administration
Scientific and Technical Information Program Office
Langley Research Center – MS157
Hampton, VA 23681

National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161

Pendragon House, Inc.
899 Broadway Avenue
Redwood City, CA 94063

Superintendent of Documents
U.S. Government Printing Office
Washington, DC 20402

University Microfilms
A Xerox Company
300 North Zeeb Road
Ann Arbor, MI 48106

University Microfilms, Ltd.
Tylers Green
London, England

U.S. Geological Survey Library National Center
MS 950
12201 Sunrise Valley Drive
Reston, VA 22092

U.S. Geological Survey Library
2255 North Gemini Drive
Flagstaff, AZ 86001

U.S. Geological Survey
345 Middlefield Road
Menlo Park, CA 94025

U.S. Geological Survey Library
Box 25046
Denver Federal Center, MS914
Denver, CO 80225

NASA CASI Price Code Table

(Effective July 1, 1998)

Code	U.S., Canada, & Mexico	Foreign
A01	$ 8.00	$ 16.00
A02	12.00	24.00
A03	23.00	46.00
A04	25.50	51.00
A05	27.00	54.00
A06	29.50	59.00
A07	33.00	66.00
A08	36.00	72.00
A09	41.00	82.00
A10	44.00	88.00
A11	47.00	94.00
A12	51.00	102.00
A13	54.00	108.00
A14	56.00	112.00
A15	58.00	116.00
A16	60.00	120.00
A17	62.00	124.00
A18	65.50	131.00
A19	67.50	135.00
A20	69.50	139.00
A21	71.50	143.00
A22	77.00	154.00
A23	79.00	158.00
A24	81.00	162.00
A25	83.00	166.00
A99	Contact NASA CASI	

Code	U.S., Canada, & Mexico	Foreign
E01	$101.00	$202.00
E02	109.50	219.00
E03	119.50	238.00
E04	128.50	257.00
E05	138.00	276.00
E06	146.50	293.00
E07	156.00	312.00
E08	165.50	331.00
E09	174.00	348.00
E10	183.50	367.00
E11	193.00	386.00
E12	201.00	402.00
E13	210.50	421.00
E14	220.00	440.00
E15	229.50	459.00
E16	238.00	476.00
E17	247.50	495.00
E18	257.00	514.00
E19	265.50	531.00
E20	275.00	550.00
E21	284.50	569.00
E22	293.00	586.00
E23	302.50	605.00
E24	312.00	624.00
E99	Contact NASA CASI	

Payment Options

All orders must be prepaid unless you are registered for invoicing or have a deposit account with the NASA CASI. Payment can be made by VISA, MasterCard, American Express, or Diner's Club credit card. Checks or money orders must be in U.S. currency and made payable to "NASA Center for AeroSpace Information." To register, please request a registration form through the NASA STI Help Desk at the numbers or addresses below.

Handling fee per item is $1.50 domestic delivery to any location in the United States and $9.00 foreign delivery to Canada, Mexico, and other foreign locations. Video orders incur an additional $2.00 handling fee per title.

The fee for shipping the safest and fastest way via Federal Express is in addition to the regular handling fee explained above—$5.00 domestic per item, $27.00 foreign for the first 1-3 items, $9.00 for each additional item.

Return Policy

The NASA Center for AeroSpace Information will replace or make full refund on items you have requested if we have made an error in your order, if the item is defective, or if it was received in damaged condition, and you contact CASI within 30 days of your original request.

NASA Center for AeroSpace Information
7121 Standard Drive
Hanover, MD 21076-1320

E-mail: help@sti.nasa.gov
Fax: (301) 621-0134
Phone: (301) 621-0390

Rev. 7/98

Federal Depository Library Program

In order to provide the general public with greater access to U.S. Government publications, Congress established the Federal Depository Library Program under the Government Printing Office (GPO), with 53 regional depositories responsible for permanent retention of material, inter-library loan, and reference services. At least one copy of nearly every NASA and NASA-sponsored publication, either in printed or microfiche format, is received and retained by the 53 regional depositories. A list of the Federal Regional Depository Libraries, arranged alphabetically by state, appears at the very end of this section. These libraries are not sales outlets. A local library can contact a regional depository to help locate specific reports, or direct contact may be made by an individual.

Public Collection of NASA Documents

An extensive collection of NASA and NASA-sponsored publications is maintained by the British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England for public access. The British Library Lending Division also has available many of the non-NASA publications cited in the STI Database. European requesters may purchase facsimile copy or microfiche of NASA and NASA-sponsored documents FIZ–Fachinformation Karlsruhe–Bibliographic Service, D-76344 Eggenstein-Leopoldshafen, Germany and TIB–Technische Informationsbibliothek, P.O. Box 60 80, D-30080 Hannover, Germany.

Submitting Documents

All users of this abstract service are urged to forward reports to be considered for announcement in the STI Database. This will aid NASA in its efforts to provide the fullest possible coverage of all scientific and technical publications that might support aeronautics and space research and development. If you have prepared relevant reports (other than those you will transmit to NASA, DOD, or DOE through the usual contract- or grant-reporting channels), please send them for consideration to:

ATTN: Acquisitions Specialist
NASA Center for AeroSpace Information
7121 Standard Drive
Hanover, MD 21076-1320.

Reprints of journal articles, book chapters, and conference papers are also welcome.

You may specify a particular source to be included in a report announcement if you wish; otherwise the report will be placed on a public sale at the NASA Center for AeroSpace Information. Copyrighted publications will be announced but not distributed or sold.

Federal Regional Depository Libraries

ALABAMA

AUBURN UNIV. AT MONTGOMERY LIBRARY
Documents Dept.
7300 University Dr.
Montgomery, AL 36117–3596
(205) 244–3650 Fax: (205) 244–0678

UNIV. OF ALABAMA
Amelia Gayle Gorgas Library
Govt. Documents
P.O. Box 870266
Tuscaloosa, AL 35487–0266
(205) 348–6046 Fax: (205) 348–0760

ARIZONA

DEPT. OF LIBRARY, ARCHIVES, AND PUBLIC RECORDS
Research Division
Third Floor, State Capitol
1700 West Washington
Phoenix, AZ 85007
(602) 542–3701 Fax: (602) 542–4400

ARKANSAS

ARKANSAS STATE LIBRARY
State Library Service Section
Documents Service Section
One Capitol Mall
Little Rock, AR 72201–1014
(501) 682–2053 Fax: (501) 682–1529

CALIFORNIA

CALIFORNIA STATE LIBRARY
Govt. Publications Section
P.O. Box 942837 – 914 Capitol Mall
Sacramento, CA 94337–0091
(916) 654–0069 Fax: (916) 654–0241

COLORADO

UNIV. OF COLORADO – BOULDER
Libraries – Govt. Publications
Campus Box 184
Boulder, CO 80309–0184
(303) 492–8834 Fax: (303) 492–1881

DENVER PUBLIC LIBRARY
Govt. Publications Dept. BSG
1357 Broadway
Denver, CO 80203–2165
(303) 640–8846 Fax: (303) 640–8817

CONNECTICUT

CONNECTICUT STATE LIBRARY
231 Capitol Avenue
Hartford, CT 06106
(203) 566–4971 Fax: (203) 566–3322

FLORIDA

UNIV. OF FLORIDA LIBRARIES
Documents Dept.
240 Library West
Gainesville, FL 32611–2048
(904) 392–0366 Fax: (904) 392–7251

GEORGIA

UNIV. OF GEORGIA LIBRARIES
Govt. Documents Dept.
Jackson Street
Athens, GA 30602–1645
(706) 542–8949 Fax: (706) 542–4144

HAWAII

UNIV. OF HAWAII
Hamilton Library
Govt. Documents Collection
2550 The Mall
Honolulu, HI 96822
(808) 948–8230 Fax: (808) 956–5968

IDAHO

UNIV. OF IDAHO LIBRARY
Documents Section
Rayburn Street
Moscow, ID 83844–2353
(208) 885–6344 Fax: (208) 885–6817

ILLINOIS

ILLINOIS STATE LIBRARY
Federal Documents Dept.
300 South Second Street
Springfield, IL 62701–1796
(217) 782–7596 Fax: (217) 782–6437

INDIANA

INDIANA STATE LIBRARY
Serials/Documents Section
140 North Senate Avenue
Indianapolis, IN 46204–2296
(317) 232–3679 Fax: (317) 232–3728

IOWA

UNIV. OF IOWA LIBRARIES
Govt. Publications
Washington & Madison Streets
Iowa City, IA 52242–1166
(319) 335–5926 Fax: (319) 335–5900

KANSAS

UNIV. OF KANSAS
Govt. Documents & Maps Library
6001 Malott Hall
Lawrence, KS 66045–2800
(913) 864–4660 Fax: (913) 864–3855

KENTUCKY

UNIV. OF KENTUCKY
King Library South
Govt. Publications/Maps Dept.
Patterson Drive
Lexington, KY 40506–0039
(606) 257–3139 Fax: (606) 257–3139

LOUISIANA

LOUISIANA STATE UNIV.
Middleton Library
Govt. Documents Dept.
Baton Rouge, LA 70803–3312
(504) 388–2570 Fax: (504) 388–6992

LOUISIANA TECHNICAL UNIV.
Prescott Memorial Library
Govt. Documents Dept.
Ruston, LA 71272–0046
(318) 257–4962 Fax: (318) 257–2447

MAINE

UNIV. OF MAINE
Raymond H. Fogler Library
Govt. Documents Dept.
Orono, ME 04469–5729
(207) 581–1673 Fax: (207) 581–1653

MARYLAND

UNIV. OF MARYLAND – COLLEGE PARK
McKeldin Library
Govt. Documents/Maps Unit
College Park, MD 20742
(301) 405–9165 Fax: (301) 314–9416

MASSACHUSETTS

BOSTON PUBLIC LIBRARY
Govt. Documents
666 Boylston Street
Boston, MA 02117–0286
(617) 536–5400, ext. 226
Fax: (617) 536–7758

MICHIGAN

DETROIT PUBLIC LIBRARY
5201 Woodward Avenue
Detroit, MI 48202–4093
(313) 833–1025 Fax: (313) 833–0156

LIBRARY OF MICHIGAN
Govt. Documents Unit
P.O. Box 30007
717 West Allegan Street
Lansing, MI 48909
(517) 373–1300 Fax: (517) 373–3381

MINNESOTA

UNIV. OF MINNESOTA
Govt. Publications
409 Wilson Library
309 19th Avenue South
Minneapolis, MN 55455
(612) 624–5073 Fax: (612) 626–9353

MISSISSIPPI

UNIV. OF MISSISSIPPI
J.D. Williams Library
106 Old Gym Bldg.
University, MS 38677
(601) 232–5857 Fax: (601) 232–7465

MISSOURI

UNIV. OF MISSOURI – COLUMBIA
106B Ellis Library
Govt. Documents Sect.
Columbia, MO 65201–5149
(314) 882–6733 Fax: (314) 882–8044

MONTANA

UNIV. OF MONTANA
Mansfield Library
Documents Division
Missoula, MT 59812–1195
(406) 243–6700 Fax: (406) 243–2060

NEBRASKA

UNIV. OF NEBRASKA – LINCOLN
D.L. Love Memorial Library
Lincoln, NE 68588–0410
(402) 472–2562 Fax: (402) 472–5131

NEVADA

THE UNIV. OF NEVADA LIBRARIES
Business and Govt. Information Center
Reno, NV 89557–0044
(702) 784–6579 Fax: (702) 784–1751

NEW JERSEY

NEWARK PUBLIC LIBRARY
Science Div. – Public Access
P.O. Box 630
Five Washington Street
Newark, NJ 07101–7812
(201) 733–7782 Fax: (201) 733–5648

NEW MEXICO

UNIV. OF NEW MEXICO
General Library
Govt. Information Dept.
Albuquerque, NM 87131–1466
(505) 277–5441 Fax: (505) 277–6019

NEW MEXICO STATE LIBRARY
325 Don Gaspar Avenue
Santa Fe, NM 87503
(505) 827–3824 Fax: (505) 827–3888

NEW YORK

NEW YORK STATE LIBRARY
Cultural Education Center
Documents/Gift & Exchange Section
Empire State Plaza
Albany, NY 12230–0001
(518) 474–5355 Fax: (518) 474–5786

NORTH CAROLINA

UNIV. OF NORTH CAROLINA – CHAPEL HILL
Walter Royal Davis Library
CB 3912, Reference Dept.
Chapel Hill, NC 27514–8890
(919) 962–1151 Fax: (919) 962–4451

NORTH DAKOTA

NORTH DAKOTA STATE UNIV. LIB.
Documents
P.O. Box 5599
Fargo, ND 58105–5599
(701) 237–8886 Fax: (701) 237–7138

UNIV. OF NORTH DAKOTA
Chester Fritz Library
University Station
P.O. Box 9000 – Centennial and University Avenue
Grand Forks, ND 58202–9000
(701) 777–4632 Fax: (701) 777–3319

OHIO

STATE LIBRARY OF OHIO
Documents Dept.
65 South Front Street
Columbus, OH 43215–4163
(614) 644–7051 Fax: (614) 752–9178

OKLAHOMA

OKLAHOMA DEPT. OF LIBRARIES
U.S. Govt. Information Division
200 Northeast 18th Street
Oklahoma City, OK 73105–3298
(405) 521–2502, ext. 253
Fax: (405) 525–7804

OKLAHOMA STATE UNIV.
Edmon Low Library
Stillwater, OK 74078–0375
(405) 744–6546 Fax: (405) 744–5183

OREGON

PORTLAND STATE UNIV.
Branford P. Millar Library
934 Southwest Harrison
Portland, OR 97207–1151
(503) 725–4123 Fax: (503) 725–4524

PENNSYLVANIA

STATE LIBRARY OF PENN.
Govt. Publications Section
116 Walnut & Commonwealth Ave.
Harrisburg, PA 17105–1601
(717) 787–3752 Fax: (717) 783–2070

SOUTH CAROLINA

CLEMSON UNIV.
Robert Muldrow Cooper Library
Public Documents Unit
P.O. Box 343001
Clemson, SC 29634–3001
(803) 656–5174 Fax: (803) 656–3025

UNIV. OF SOUTH CAROLINA
Thomas Cooper Library
Green and Sumter Streets
Columbia, SC 29208
(803) 777–4841 Fax: (803) 777–9503

TENNESSEE

UNIV. OF MEMPHIS LIBRARIES
Govt. Publications Dept.
Memphis, TN 38152–0001
(901) 678–2206 Fax: (901) 678–2511

TEXAS

TEXAS STATE LIBRARY
United States Documents
P.O. Box 12927 – 1201 Brazos
Austin, TX 78701–0001
(512) 463–5455 Fax: (512) 463–5436

TEXAS TECH. UNIV. LIBRARIES
Documents Dept.
Lubbock, TX 79409–0002
(806) 742–2282 Fax: (806) 742–1920

UTAH

UTAH STATE UNIV.
Merrill Library Documents Dept.
Logan, UT 84322–3000
(801) 797–2678 Fax: (801) 797–2677

VIRGINIA

UNIV. OF VIRGINIA
Alderman Library
Govt. Documents
University Ave. & McCormick Rd.
Charlottesville, VA 22903–2498
(804) 824–3133 Fax: (804) 924–4337

WASHINGTON

WASHINGTON STATE LIBRARY
Govt. Publications
P.O. Box 42478
16th and Water Streets
Olympia, WA 98504–2478
(206) 753–4027 Fax: (206) 586–7575

WEST VIRGINIA

WEST VIRGINIA UNIV. LIBRARY
Govt. Documents Section
P.O. Box 6069 – 1549 University Ave.
Morgantown, WV 26506–6069
(304) 293–3051 Fax: (304) 293–6638

WISCONSIN

ST. HIST. SOC. OF WISCONSIN LIBRARY
Govt. Publication Section
816 State Street
Madison, WI 53706
(608) 264–6525 Fax: (608) 264–6520

MILWAUKEE PUBLIC LIBRARY
Documents Division
814 West Wisconsin Avenue
Milwaukee, WI 53233
(414) 286–3073 Fax: (414) 286–8074

Typical Report Citation and Abstract

❶ 19970001126 NASA Langley Research Center, Hampton, VA USA
❷ Water Tunnel Flow Visualization Study Through Poststall of 12 Novel Planform Shapes
❸ Gatlin, Gregory M., NASA Langley Research Center, USA Neuhart, Dan H., Lockheed Engineering and Sciences Co., USA;
❹ Mar. 1996; 130p; In English
❺ Contract(s)/Grant(s): RTOP 505-68-70-04
❻ Report No(s): NASA-TM-4663; NAS 1.15:4663; L-17418; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche
❼ To determine the flow field characteristics of 12 planform geometries, a flow visualization investigation was conducted in the Langley 16- by 24-Inch Water Tunnel. Concepts studied included flat plate representations of diamond wings, twin bodies, double wings, cutout wing configurations, and serrated forebodies. The off-surface flow patterns were identified by injecting colored dyes from the model surface into the free-stream flow. These dyes generally were injected so that the localized vortical flow patterns were visualized. Photographs were obtained for angles of attack ranging from 10' to 50', and all investigations were conducted at a test section speed of 0.25 ft per sec. Results from the investigation indicate that the formation of strong vortices on highly swept forebodies can improve poststall lift characteristics; however, the asymmetric bursting of these vortices could produce substantial control problems. A wing cutout was found to significantly alter the position of the forebody vortex on the wing by shifting the vortex inboard. Serrated forebodies were found to effectively generate multiple vortices over the configuration. Vortices from 65' swept forebody serrations tended to roll together, while vortices from 40' swept serrations were more effective in generating additional lift caused by their more independent nature.
❽ Author
❾ *Water Tunnel Tests; Flow Visualization; Flow Distribution; Free Flow; Planforms; Wing Profiles; Aerodynamic Configurations*

Key

1. Document ID Number; Corporate Source
2. Title
3. Author(s) and Affiliation(s)
4. Publication Date
5. Contract/Grant Number(s)
6. Report Number(s); Availability and Price Codes
7. Abstract
8. Abstract Author
9. Subject Terms

AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 485)

FEBRUARY 22, 1999

51
LIFE SCIENCES (GENERAL)

19990014242 NASA Kennedy Space Center, Cocoa Beach, FL USA

Influence of Changes in Daylength and Carbon Dioxide on the Growth of Potato

Wheeler, Raymond, NASA Kennedy Space Center, USA; Tibbitts, Theodore W., Wisconsin Univ., USA; Annals of Botany; 1997; ISSN 0305-7364; Volume 79, pp. 529-533; In English; Copyright; Avail: Issuing Activity, Hardcopy, Microfiche

Potatoes (Solanum tuberosum L.) are highly productive in mid- to high-latitude areas where photoperiods change significantly throughout the growing season. to study the effects of changes in photoperiod on growth and tuber development of potato cv. Denali, plants were grown for 112 d with 400 micromol/sq m/s photosynthetic photon flux (PPF) under a 12-h photoperiod (short days, SD), a 24-h photoperiod (long days, LD), and combinations where plants were moved between the two photoperiods 28, 56, or 84 d after planting. Plants given LD throughout growth received the greatest total daily PPF and produced the greatest tuber yields. At similar levels of total PPF, plants given SD followed by LD yielded greater tuber dry mass (DM) than plants given LD followed by SD. Stem DM per plant, leaf DM, and total plant DM all increased with an increasing proportion of LD and increasing daily PPF, regardless of the daylength sequence. When studies were repeated, but at an enriched (1000micromol/mol) CO2 concentration, overall growth trends were similar, with high CO2 resulting in greater stem length, stem DM, leaf DM, and total plant DM; but high CO2 did not increase tuber DM.

Author

Potatoes; Carbon Dioxide Concentration; Photosynthesis; Planting; Carbon Dioxide

19990014243 Dynamac Corp., Cocoa Beach, FL USA

Evaluation of an Anaerobic Digestion System for Processing CELSS Crop Residues for Resource Recovery

Strayer, R. F., Dynamac Corp., USA; Finger, B. W., Dynamac Corp., USA; Alazraki, M. P., Dynamac Corp., USA; Advances in Space Research; 1997; ISSN 0273-1177; Volume 20, No. 10, pp. 2009-2015; In English; Copyright; Avail: Issuing Activity, Hardcopy, Microfiche

Three bioreactors, connected in series, were used to process CELSS potato residues for recovery of resources. The first stage was an anaerobic digestor (8 L working volume; cow rumen contents inoculum; fed-batch; 8 day retention time; feed rate 25 gdw/day) that converted 33% of feed (dry weight loss) to CO2 and "volatile fatty acids" (vfa, 83:8:8 mmolar ratio acetic:propionic:butyric). High nitrate-N in the potato residue feed was absent in the anaerobic effluent, with a high portion converted to NH4(+)-N and the remainder unaccounted and probably lost to denitrification and NH4(+) volatilization. Liquid anaerobic effluent was fed to an aerobic, yeast biomass production vessel (2 L volume; Candida ingens inoculum; batch [pellicle] growth; 2 day retention time) where the VFAs and some NH4(+)-N were converted into yeast biomass. Yeast yields accounted for up to 8% of potato residue fed into the anaerobic bioreactor. The third bioreactor (0.5 L liquid working volume; commercial nitrifier inoculum; packed-bed biofilm; continuous yeast effluent feed; recirculating; constant volume; 2 day hydraulic retention time) was used to convert successfully the remaining NH4(+)-N into nitrate-N (preferred form of N for CELSS crop production) and to remove the remaining degradable soluble organic carbon. Effluents from the last two stages were used for partial replenishment of minerals for hydroponic potato production.

Author

Crop Growth; Bioreactors; Potatoes; Replenishment; Nitrates; Bioconversion; Closed Ecological Systems; Denitrogenation

19990014244 Dynamac Corp., Cocoa Beach, FL USA

Effects of Bioreactor Retention Time on Aerobic Microbial Decomposition of CELSS Crop Residues

Strayer, R. F., Dynamac Corp., USA; Finger, B. W., Dynamac Corp., USA; Alazraki, M. P., Dynamac Corp., USA; Advances in

Space Research; 1997; ISSN 0273-1177; Volume 20, No. 10, pp. 2023-2028; In English; Copyright; Avail: Issuing Activity, Hardcopy, Microfiche

The focus of resource recovery research at the KSC-CELSS Breadboard Project has been the evaluation of microbiologically mediated biodegradation of crop residues by manipulation of bioreactor process and environmental variables. We will present results from over 3 years of studies that used laboratory- and breadboard-scale (8 and 120 L working volumes, respectively) aerobic, fed-batch, continuous stirred tank reactors (CSTR) for recovery of carbon and minerals from breadboard grown wheat and white potato residues. The paper will focus on the effects of a key process variable, bioreactor retention time, on response variables indicative of bioreactor performance. The goal is to determine the shortest retention time that is feasible for processing CELSS crop residues, thereby reducing bioreactor volume and weight requirements. Pushing the lower limits of bioreactor retention times will provide useful data for engineers who need to compare biological and physicochemical components. Bioreactor retention times were manipulated to range between 0.25 and 48 days. Results indicate that increases in retention time lead to a 4-fold increase in crop residue biodegradation, as measured by both dry weight losses and CO2 production. A similar overall trend was also observed for crop residue fiber (cellulose and hemicellulose), with a noticeable jump in cellulose degradation between the 5.3 day and 10.7 day retention times. Water-soluble organic compounds (measured as soluble TOC) were appreciably reduced by more than 4-fold at all retention times tested. Results from a study of even shorter retention times (down to 0.25 days), in progress, will also be presented.

Author

Bioreactors; Biodegradation; Microorganisms; Decomposition; Closed Ecological Systems; Wheat; Residues

19990014245 NASA Kennedy Space Center, Cocoa Beach, FL USA

Effect of Elevated Carbon Dioxide on Nutritional Quality of Tomato

Wheeler, R. M., NASA Kennedy Space Center, USA; Mackowiak, C. L., Dynamac Corp., USA; Stutte, G. W., Dynamac Corp., USA; Yorio, N. C., Dynamac Corp., USA; Berry, W. L., California Univ., USA; Advances in Space Research; 1997; ISSN 0273-1177; Volume 20, No. 10, pp. 1975-1978; In English; Copyright; Avail: Issuing Activity, Hardcopy, Microfiche

Tomato (Lycopersicon esculentum Mill.) cvs. Red Robin (RR) and Reimann Philipp (RP) were grown hydroponically for 105 d with a 12 h photoperiod, 26 C/22 C thermoperiod, and 500 micromol/ sq m/s PPF at either 400, 1200, 5000, or 10,000 micromol/mol (0.04, 0.12, 0.50, 1.00 kPa) CO2. Harvested fruits were analyzed for proximate composition, total dietary fiber, nitrate, and elemental composition. No trends were apparent with regard to CO2 effects on proximate composition, with fruit from all treatments and both cultivars averiging 18.9 % protein, 3.6 % fat, 10.2 % ash, and 67.2 % carbohydrate. In comparison, average values for field-grown fruit are 16.6 % protein, 3.8 % fat, 8.1 % ash, and 71.5 % carbohydrate (Duke and ATChely, 1986). Total dietary fiber was highest at 10,000 micromol/mol (28.4 % and 22.6 % for RR and RP) and lowest at 1000 micromol/mol (18.2 % and 15.9 % for RR and RP), but showed no overall trend in response to CO2. Nitrate values ranged from 0.19 % to 0.35 % and showed no trend with regard to CO2. K, Mg, and P concentrations showed no trend in response to CO2, but Ca levels increased from 198 and 956 ppm in RR and RP at 400 micromol/mol, to 2537 and 2825 ppm at 10,000 micromol/mol. This increase in Ca caused an increase in fruit Ca/P ratios from 0.07 and 0.37 for RR and RP at 400 micromol/molto 0.99 and 1.23 for RR and RP at 10,000 micromol/mol suggesting that more dietary Ca should be available from high CO2-grown fruit.

Author

Tomatoes; Carbon Dioxide; Chemical Composition; Hydroponics; Nitrates; Nutrition

19990014246 NASA Kennedy Space Center, Cocoa Beach, FL USA

Ethylene Production by Plants in a Closed Environment

Wheeler, R. M., NASA Kennedy Space Center, USA; Peterson, B. V., NASA Kennedy Space Center, USA; Sager, J. C., NASA Kennedy Space Center, USA; Knott, W. M., NASA Kennedy Space Center, USA; Advances in Space Research; 1996; ISSN 0273-1177; Volume 18, No. 4/5, pp. (4/5)193-(4/5)196; In English; Copyright; Avail: Issuing Activity, Hardcopy, Microfiche

Ethylene production by 20-sq m stands of wheat, soybean, lettuce and potato was monitored throughout growth and development in NASA's Controlled Ecological Life Support System (CELSS) Biomass Production Chamber. Chamber ethylene concentrations rose during periods of rapid growth for all four species, reaching 120 parts per billion (ppb) for wheat, 60 ppb for soybean, and 40 to 50 ppb for lettuce and potato. Following this, ethylene concentrations declined during seed fill and maturation (wheat and soybean), or remained relatively constant (potato). Lettuce plants were harvested during rapid growth and peak ethylene production. The highest ethylene production rates (unadjusted for chamber leakage) ranged from 0.04 to 0.06 ml/sq m/day during rapid growth of lettuce and wheat stands, or approximately 0.8 to 1.1 ml/g fresh weight/h. Results suggest that ethylene

production by plants is a normal event coupled to periods of rapid metabolic activity, and that ethylene removal or control measures should be considered for growing crops in a tightly closed CELSS.
Author
Closed Ecological Systems; Ethylene; Ecosystems; Soybeans; Biomass; Life Support Systems

52
AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and effects of weightlessness on man and animals.

19990014355 Advisory Group for Aerospace Research and Development, Aerospace Medical Panel, Neuilly-Sur-Seine, France
Laser Generated 3-D Space Display Images
Taboada, J., Advisory Group for Aerospace Research and Development, France; Aerospace 2020; Sep. 1997; Volume 3, pp. 7-10; In English; Also announced as 19990014353; Copyright Waived; Avail: CASI; A01, Hardcopy; A02, Microfiche

Conventional techniques of forming three dimensional (3-D) images on a two dimensional screen involve the use of electronic or optical tricks, such as the use of special eyewear. In a 3-D space display, however, the images are formed directly from luminous points distributed in all three spatial dimensions. Instead of pixels, one has voxels (volume-pixels). There are a number of approaches currently under development for 3-D space displays, some holographic and others mechanical, but the goal is to achieve a 3-D space display with no moving parts and a full 360 degree view requiring no special eyewear. This goal is within reach through the use of new two-photon laser photoexcitation techniques where two laser beams of different wavelengths intersect in a special transparent media. Fluorescence is emitted at the intersection where the combinations of the excitations creates the emissions. By multiplexing the laser beams throughout the media, a solid display object can thus be synthesized. This presentation will review the state-of-the-art of 3-D space display technology and develop a prospectus for future applications in air traffic control and mission management.
Author
Display Devices; Visual Aids; Virtual Reality

19990014457 NASA Langley Research Center, Hampton,VA USA
Aerospace Medicine and Biology: A Continuing Bibliography, Supplement 483
Jan. 25, 1999; 21p; In English
Report No.(s): NASA/SP-1999-7011/SUPPL483; NAS 1.21:7011/SUPPL483; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Aerospace Medicine and Biology concentrates on the biological, physiological, psychological, and environmental effects to which humans are subjected during and following simulated or actual flight in the Earth's atmosphere or in interplanetary space. References describing similar effects on biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. Applied research receives the most emphasis, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.
Derived from text
Aerospace Medicine; Biology; Toxicology; Psychological Effects; Pharmacology; Life Support Systems; Interplanetary Space; Exobiology; Environment Effects; Earth Atmosphere

19990014461 Iowa Univ., Dept. of Psychology, Iowa City, IA USA
Central Renin Injections: Effects on Drinking and Expression of Immediate Early Genes
Xu, Zhice, Iowa Univ., USA; Johnson, Alan Kim, Iowa Univ., USA; Brain Research; 1998; ISSN 0006-8993; Volume 782, pp. 24-35; In English
Contract(s)/Grant(s): N00014-97-1-0145; NAG5-6171; NIH-HL-14388; NIH-HL-57472; No Copyright; Avail: Issuing Activity, Hardcopy, Microfiche

This study investigated the drinking response and the expression of Fos- and Egr-1-immunoreactivity (Fos-ir, Egr-1-ir) in the brain induced by endogenous angiotensin generated by intracerebroventricular (i.c.v.) injection of renin. Renin induced Fos-ir in the subformical organ (SFO), median preoptic (MnPO), supraoptic and paraventricular nuclei (SON and PVN), area postrema (AP), nuclei of the solitary tract (NTS) and lateral parabrachial nuclei (LPBN). Renin-induced Egr-1-ir exhibited a similar pattern of distribution as that observed for Fos-ir. The dose of i.c.v. renin that induced expression of immediate early gene (IEG) product immunoreactivity also produced vigorous drinking. When renin-injected rats were pretreated with captopril, an angiotensin con-

verting enzyme inhibitor, drinking was blocked. With the same captopril pretreatment, both Fos- and Egr-1-ir in the SFO, MnPO, SON, PVN, AP and LPBN were also significantly reduced.
Author
Brain; Enzymes; Drinking; Genes

19990014462 Paulista State Univ., Dept. of Physiology, Araraquara Brazil
Lateral Parabrachial Nucleus Serotonergic Mechanisms and Salt Appetite Induced by Sodium Depletion
Menani, Jose Vanderlei, Paulista State Univ., Brazil; DeLuca, Laurival Antonio, Jr., Paulista State Univ., Brazil; Johnson, Alan Kim, Iowa Univ., USA; American Journal of Physiology; 1998; ISSN 0363-6119, pp. R555-R559; In English
Contract(s)/Grant(s): N00014-97-1-0145; NAG5--6171; CNPq-93/0167-7; CAPES-AEX-1400/94-0; Copyright; Avail: Issuing Activity, Hardcopy, Microfiche

This study investigated the effects of bilateral injections of a serotonin (5-HT) receptor agonist into the lateral parabrachial nucleus on the intake of NaCl and water induced by 24-h water deprivation or by sodium depletion followed by 24 h of sodium deprivation (injection of the diuretic furosemide plus 24 h of d sodium-deficient diet). Rats had stainless steel cannulas implanted bilaterally into the LPBN. Bilateral LPBN injections of the serotonergic 5-HT(1/2) receptor antagonist methysergide (4 micro-g/200 nl at each site) increased hypertonic NaCl intake when tested 24 h after sodium depletion and after 24 h of water deprivation. Water intake also increased after bilateral injections of methysergide into the LPBN. In contrast, the intake of a palatable solution (0.06 M sucrose) under body fluid-replete conditions was not changed after bilateral LPBN methysergide injections. The results show that serotonergic mechanisms in the LPBN modulate water and sodium intake induced by volume depletion and sodium loss. The finding that sucrose intake was not affected by LPBN serotonergic blockade suggests that the effects of the methysergide treatment on the intakes of water and NaCl are not due to a mechanism producing a nonspecific enhancement of all ingestive behaviors.
Author
Serotonin; Sodium; Diuretics; Water Deprivation; Sucrose; Body Fluids; Sodium Chlorides

19990014463 Iowa Univ., Dept. of Psychology, Iowa City, IA USA
Central Methysergide Prevents Renal Sympathoinhibition and Bradycardia during Hypotensive Hemorrhage
Veelken, Roland, Erlangen-Nuernberg Univ., Germany; Johnson, Kim, Iowa Univ., USA; Scrogin, Karie E., Iowa Univ., USA; American Journal of Physiology; 1998; ISSN 0363-6135, pp. H43-H51; In English
Contract(s)/Grant(s): N00014-97-1-0145; NAG5-6171; NAGw-4358; NIH-HL-14388; NIH-HL-57472; NIH-HL-07121; NIH-HL-09545; Copyright; Avail: Issuing Activity, Hardcopy, Microfiche

Central methysergide prevents renal sympathoinhibition and bradycardia during hypotensive hemorrhage. Mean arterial pressure (MAP), heart rate (HR), and renal sympathetic nerve activity (RSNA) were measured in conscious rats during either hemorrhage or cardiopulmonary receptor stimulation with phenylbiguanide (PBG) after intracerebroventricular injection of the 5-HT1/5-HT2-receptor antagonist, methysergide (40 microg). Progressive hemorrhage caused an initial rise (109 +/- 33%) followed by a fall in RSNA (-60 +/- 7%) and a fall in HR (-126 +/- 7 beats/min). Methysergide delayed the hypotension and prevented both the sympathoinhibitory and bradycardic responses to hemorrhage. Systemic 5-HT3-receptor blockade did not influence responses to hemorrhage. The PBG infusion caused transient depressor(-25 +/- 6 mmHg), bradycardic (-176 +/- 40 beats/min), and renal sympathostimulatory (182 +/-47% baseline) responses that were not affected by central methysergide (-20 +/- 6 mmHg, -162 +/- 18 beats/min, 227 +/- 46% baseline). These data indicate that a central serotonergic receptor-mediated component contributes to the sympathoinhibitory and bradycardic responses to hypotensive hemorrhage in conscious rats. Furthermore, the same central 5-HT-receptor populations involved in reflex responses to hypotensive hemorrhage probably do not mediate the sympathoinhibitory response to cardiopulmonary chemosensitive 5-HT3 receptors.
Author
Hemorrhages; Bradycardia; Heart Rate; Hypotension; Heart Function

19990017762 Army Aeromedical Research Lab., Fort Rucker, AL USA
The Efficacy of Dexedrine for the Sustainment of Helicopter Pilot Performance During 64 Hours of Continuous Wakefulness *Final Report*
Caldwell, J. A.; Smythe, N. K.; DeDuc, P. A.; Prazinko, B. F.; Caldwell, J. L.; Oct. 1998; 68p; In English
Contract(s)/Grant(s): Proj-3M162787A879
Report No.(s): AD-A356084; USAARL-TR-99-01; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The purpose of this investigation was to establish the efficacy of Dexedrine for sustaining aviator performance despite 64-hours of extended wakefulness. Although earlier flight studies yielded favorable results with no significant side effects, they

were restricted to sleep-deprivation periods of only 40 hours. Due to requirements for longer periods of sustained wakefulness, it was necessary to study the efficacy of Dexedrine for maintaining aviator performance during 3 days and 2 nights without sleep. to accomplish this, computerized evaluations of aviator flight skills were conducted at regular intervals as subjects completed standardized flights in a UH-60 helicopter simulator, both: under Dexedrine and placebo. Laboratory-based assessments of cognitive, psychological, and central nervous system status were completed as well. Dexedrine (10 mg.) was given prophylactically (prior to signs of fatigue) at midnight, 0400, and 0800 on both deprivation days in one cycle, and placebo was given on both days in the other. Results indicated simulator flight performance was maintained by Dexedrine for up to 58 hours, while performance under placebo rapidly deteriorated. The drug was most beneficial

DTIC

Drugs; Amphetamines; Effectiveness; Helicopter Performance; Research; Aircraft Pilots; Human Performance

19990017765 Army Aeromedical Research Lab., Fort Rucker, AL USA

Recovery of Sleep, Performance, and Mood Following 38 Hours of Sleep Deprivation Using Naps as a Countermeasure *Final Report*

Caldwell, J. L.; Caldwell, John A., Jr.; Colon, Jose; Ruyak, Peggy S.; Ramspott, Stephanie; Sep. 1998; 32p; In English

Contract(s)/Grant(s): Proj-3M162787A879

Report No.(s): AD-A356097; USAARL-98-37; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

In certain situations, soldiers must continue to perform their duties over an extended period of time, knowing that their regular sleep period will be missed and their time awake will extend well past 24 hours. Although equipment may be able to operate over extended work hours, personnel are not capable of continuing for days without proper rest and recovery. However, during the times when extended work hours are required, soldiers must find a way to maintain alertness in order to carry out their duties. When one chooses a countermeasure to aid soldiers' performance, the decision is based on how well the method will increase alertness and performance. However, one must also examine how a person will recover from the countermeasure, how long it will take before he/she is ready to continue the work schedule, and what consequences will occur due to the countermeasure. Many studies are aimed at how well countermeasures work in the short run, but neglect to examine the aftereffects.

DTIC

Sleep Deprivation; Rest; Sleep; Stress (Psychology); Stress Relieving; Human Performance; Military Technology

19990017776 NASA Johnson Space Center, Houston, TX USA

Changes in Compensatory Eye Movements Associated with Simulated Stimulus Conditions of Spaceflight

Harm, Deborah L., NASA Johnson Space Center, USA; Zografos, Linda M., NASA Johnson Space Center, USA; Skinner, Noel C., NASA Johnson Space Center, USA; Parker, Donald E., Miami Univ., USA; Aviation, Space, and Environmental Medicine; September 1993, pp. 820-826; In English

Contract(s)/Grant(s): NAS9-17720; NAS9-17413; NAG9-703

Report No.(s): NASA/CR-93-207266; NAS 1.26:207266; Copyright Waived (NASA); Avail: CASI; A02, Hardcopy; A01, Microfiche

Compensatory vertical eye movement gain (CVEMG) was recorded during pitch oscillation in darkness before, during and immediately after exposures to the stimulus rearrangement produced by the Preflight Adaptation Trainer (PAT) Tilt-Translation Device (TTD). The TTD is designed to elicit adaptive responses that are similar to those observed in microgravity-adapted astronauts. The data from Experiment 1 yielded a statistically significant CVEMG decrease following 15 minutes of exposure to a stimulus rearrangement condition where the phase angle between subject pitch tilt and visual scene translation was 270 degrees; statistically significant gain decreases were not observed following exposures either to a condition where the phase angle between subject pitch and scene translation was 90 degrees or to a no-stimulus-rearrangement condition. Experiment 2 replicated the 270 degree phase condition from Experiment 1 and extended the exposure duration from 30 to 45 minutes. Statistically significant additional changes in CVEMG associated with the increased exposure duration were not observed. The adaptation time constant estimated from the combined data from Experiments 1 and 2 was 29 minutes.

Author

Eye Movements; Microgravity; Astronaut Training; Physiological Effects; Aerospace Medicine; Otolith Organs; Bioastronautics; Weightlessness

53
BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

19990014354 Advisory Group for Aerospace Research and Development, Aerospace Medical Panel, Neuilly-Sur-Seine, France
Drawing on Today's Wise Investments: Longitudinal and Baseline Human-Resource Research
King, R. E., Advisory Group for Aerospace Research and Development, France; McGlohn, S. E., Advisory Group for Aerospace Research and Development, France; Retzlaff, P. D., Advisory Group for Aerospace Research and Development, France; Aerospace 2020; Sep. 1997; Volume 3, pp. 3-6; In English; Also announced as 19990014353; Copyright Waived; Avail: CASI; A01, Hardcopy; A02, Microfiche

Many of the pilots who will be flying in the year 2020 are just now being born or are currently very young children. We will know more about these pilots than we presently know about our current pilots. The air forces of the future will surely include many more women as they will likely compete on an equal footing and may be represented in all cockpits. Efforts currently underway, including Neuropsychiatrically Enhanced Flight Screening, Assessment of Psychological Factors in Aviators and Psychological Factors of Aviators' Success may bear fruit and answer the question of whether female pilots self-select into aviation or if they are shaped as a result of the process of pilot training. The year 2020 may see the Armstrong Laboratory Aviator Personality Survey as a well established test for use with aviators, with international norms. As we invest increasingly large amounts of money into each individual airframe and mission, we must learn more about the human operator, whether that individual is a pilot or a controller of a pilotless aircraft or spacecraft (Uninhabited Aerial Vehicle).
Author
Human Resources; Aircraft Pilots; Personnel Development; Human Performance

54
MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing. For related information see also 16 Space Transportation.

19990014371 Advisory Group for Aerospace Research and Development, Mission Systems Panel, Neuilly-Sur-Seine, France
Integration of Technologies for Closed Cockpits
Timmers, H., Advisory Group for Aerospace Research and Development, France; Helps, K., Advisory Group for Aerospace Research and Development, France; Aerospace 2020; Sep. 1997; Volume 3, pp. 78; In English; Also announced as 19990014353; Copyright Waived; Avail: CASI; A01, Hardcopy; A02, Microfiche; Abstract Only; Abstract Only

All future aerial missions are threatened by directed energy weapons (DEWS) or flash devices. The availability of rather inexpensive blinding flash devices can soon significantly hinder or even prevent the effective use of air power. In order to protect aircrews and enable them to successfully continue the mission the concept of closed cockpits will be an important means to overcome these threats. Processing capabilities which will be available in the near to midterm future make the realization of closed cockpits feasible. Still, the closed cockpit impose some severe problems which must be solved in order to maintain crew awareness under all circumstances and in all phases of flight. To name only a few of them, problems associated with synthetic vision, sensor displays and sensor integration or pilot interaction with all aircraft systems must be solved to make the closed cockpit concept operational viable. It must be proven, that sensors can be built, which work reliably under all conditions (including massive counter measures), that all available data can be fused together and that all these sensors can be integrated in a way to give results which can be trusted and effectively communicated to the aircrew. The realization of closed cockpits is a task, which requires contributions from many other technology fields, hence, it works as a technology driver also outside it direct field of application. The benefits of the closed cockpit will be the ability to perform aerial missions also in presence of a new class of threats successfully.
Author
Cockpits; Pilot Support Systems; Multisensor Fusion; Systems Integration; Flight Management Systems

Subject Term Index

Personal Author Index

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY (*Leave blank*)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	February 22, 1999	Special Publication

4. TITLE AND SUBTITLE
Aerospace Medicine and Biology
A Continuing Bibliography (Supplement 485)

5. FUNDING NUMBERS

6. AUTHOR(S)

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
NASA Scientific and Technical Information Program Office

8. PERFORMING ORGANIZATION REPORT NUMBER
NASA/SP-1998-7011/Suppl485

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
National Aeronautics and Space Administration
Langley Research Center
Hampton, VA 23681

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT

Subject Category: Distribution:
Availability: NASA CASI (301) 621-0390

12b. DISTRIBUTION CODE
Unclassified--Unlimited
Subject Category - 52

13. ABSTRACT *(Maximum 200 words)*

This report lists reports, articles and other documents recently announced in the NASA STI Database.

14. SUBJECT TERMS
Aerospace Medicine
Bibliographies
Biological Effects

15. NUMBER OF PAGES
22

16. PRICE CODE
A03/HC

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified		